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7E7011

Roll No. _____

Total No of Pages: 4**7E7011****B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018****Mechanical Engineering
7ME1A Finite Element Methods
Common With ME, PI****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:**Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.**Units of quantities used/calculated must be stated clearly.**Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*1. NIL2. NIL**UNIT- I**

Q.1 (a) Explain the following –

- (i) Uniqueness of a solution [2]
- (ii) Banded Symmetric Matrix [2]
- (iii) Meshing [2]
- (iv) Band width and semi band width [2]
- (b) Explain Gauss elimination method with the help of an example. [8]

OR

- Q.1 (a) Describe general procedure to solve Finite Element Method Problem. [8]
- (b) Derive global stiffness matrix for a three spring system using local stiffness matrix for each element. [8]

UNIT- II

- Q.2 (a) Explain principal of minimum potential energy. Also write an example to explain it. [8]

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- (b) The figure 1 below shows a system of three linear spring elements connected as shown. Node 1 is fixed and node 3 is given a specified displacement δ . Determine the nodal displacement and forces required at node 3 for the specified conditions. [8]

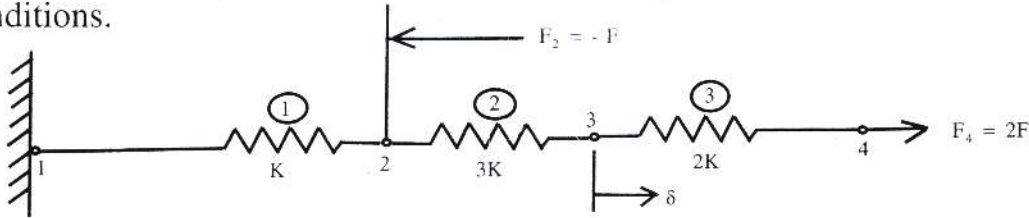


Figure - 1

OR

- Q.2 (a) Explain in detail stress and strain tensor. Support your answer with neat diagrams. [8]
- (b) Consider a stepped bar as shown in figure 2, for which $E = 200\text{GPa}$, $A_1 = 200\text{mm}^2$ and $A_2 = 10\text{mm}^2$. Determine nodal displacements, reaction forces and stresses in each element. [8]

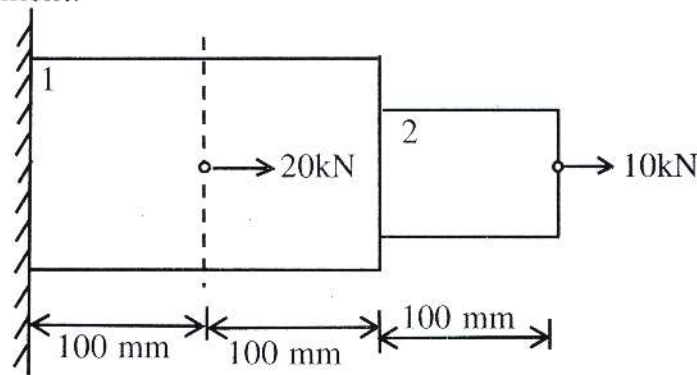


Figure - 2

UNIT- III

- Q.3 (a) Explain constant strain triangle (CST). Also formulate its shape functions. [8]
- (b) For a three bar truss system shown in figure 3, determine the nodal displacements and stresses in each member. Find the support reactions also. Take $E = 200\text{GPa}$. [8]

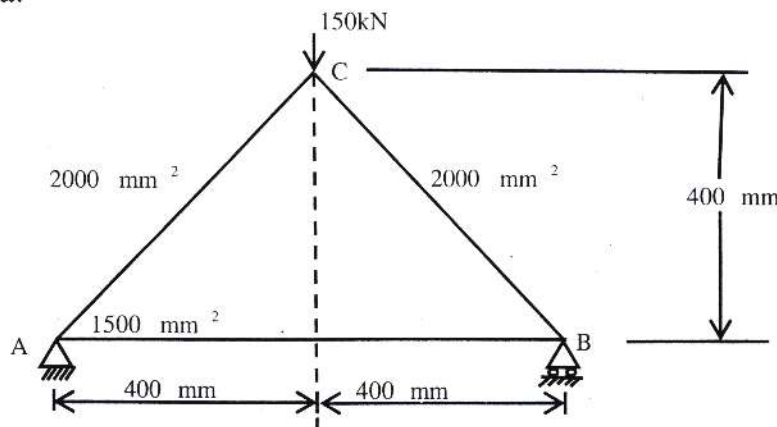


Figure 3

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OR

- Q.3 (a) Describe the formulation for plane stress and plane strain problems. [4]
- (b) Find the nodal displacements and element stresses in propped beam shown in figure 4. Idealize the beam into two CST elements as shown. Assume plane stress conditions. Take $\mu = 0.25$, $E = 2 \times 10^5 \text{ N/mm}^2$ and thickness $(t) = 15 \text{ mm}$. [12]

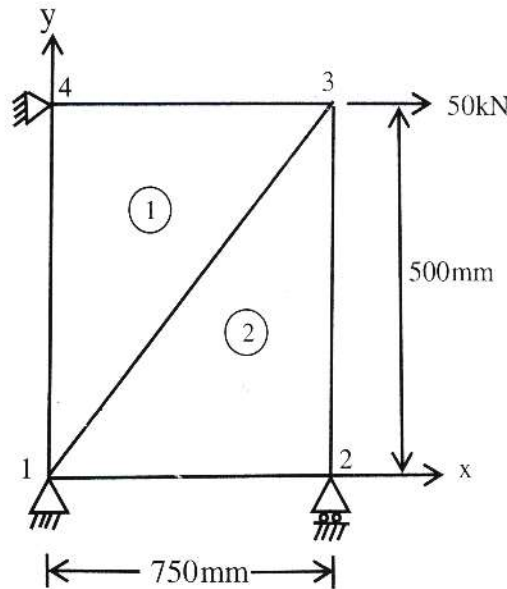


Figure -4

UNIT- IV

- Q.4 (a) Explain 1 Dimensional heat transfer for a bar element in detail. [4]
- (b) Using Rayleigh – Ritz method, determine the expression for displacement and stress in a fixed bar subjected to axial force P as shown in figure 5, Also, draw displacement and stress variation diagram. Take three terms in displacement function. [12]

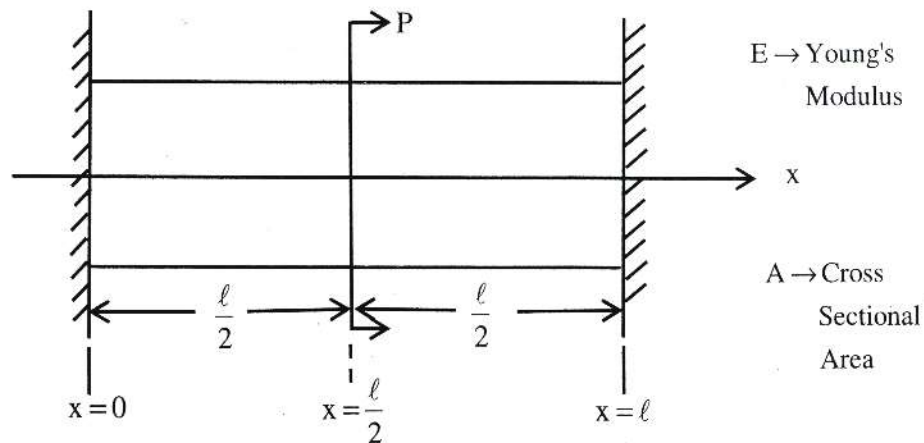


Figure -5

OR

- Q.4 (a) Using Galerkin's approach, find element stiffness matrix and force vector for 1 dimension equilibrium equation.

$$\frac{d}{dx} \left(EA \frac{du}{dx} \right) + e Ag = 0$$

Use quadratic interpolation for displacement variable u. Explain the essential and natural boundary condition involved in this problem. [8]

- (b) Calculate the maximum deflection in a simply supported beam as shown in figure 6, subjected to concentrated load 'P' at the center of the beam. (Use collocation method) [8]

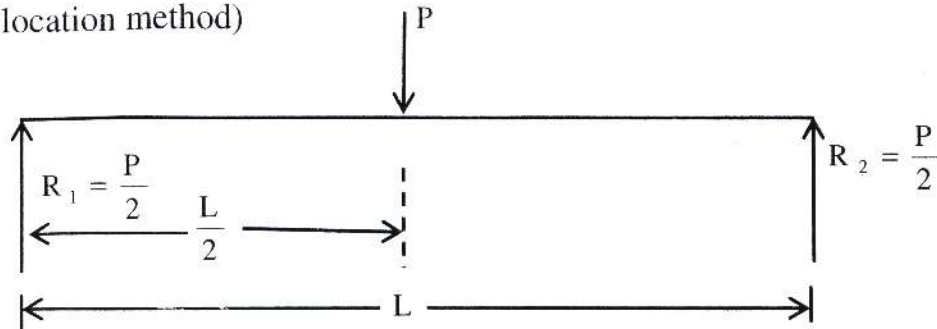


Figure - 6

UNIT- V

- Q.5 (a) Explain the following -

- (i) Convergence of solution [2]
- (ii) Compatibility [2]
- (iii) Element Continuity [2]
- (iv) Static Condensation [2]

- (b) Explain P and h methods of mesh refinement. [8]

OR

- Q.5 (a) Using Lagrange's interpolation formula, find the value of y for x = 9.5 from the table - [8]

x	7	8	9	10
y	3	1	1	9

- (b) Write applications and advantages of Finite Element Method. [8]

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7E7012

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7E7012

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Mechanical Engineering

7ME2A Refrigeration and Air-Conditioning

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL

UNIT- I

Q.1 (a) Discuss the actual vapour compression cycle with the help of P-h and T-S diagram. [8]

(b) A refrigerator's storage is supplied with 3700 kJ of a substance at a temperature of 27°C. A substance has to be cooled at -23°C. The cooling is about 10 hours. The specific heat of substance is 2 kJ/kg-K above freezing point and 0.5kJ/kg-K below freezing point. The freezing point of a substance is -3°C. The latent heat of freezing is 230 kJ/kg. What is the power required to drive the plant in kW if the actual COP is the half of ideal COP? [8]

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OR

- Q.1 (a) Explain the construction and working of flash chamber incorporated in vapour compression system. How removal of flash gas helps in improving the performance of compound vapour compression refrigeration system. [8]
- (b) Explain with the help of neat sketch, the working of a refrigeration system having three evaporators at different temperatures with individual compressors and multiple expansion valves. [8]

UNIT- II

- Q.2 (a) Air is used as refrigerants in a reversed Brayton cycle. Draw T-S and P-V diagram for this cycle and derive the expression for COP in terms of pressure ratio (γ_p). [8]
- (b) A gas refrigeration system working on reversed Brayton cycle at a temperature of 250K at the inlet of the compressor. If the temperature at the end of constant pressure cooling is 300K and raising the temperature of air in refrigerator is 50K, then find the network out? (Take $C_p = 1\text{kJ/kg-K}$). [8]

OR

- Q.2 (a) A dense air refrigeration cycle operates between pressures of 4 bar and 16 bar. The air temperature after heat rejection to surroundings is 37°C and air temperature at exit of refrigerator is 7°C. The Isentropic efficiencies of turbine and compressor are 0.85 and 0.80 respectively. Determine compressor and turbine work per TR, C.O.P and power per TR, Take $\gamma = 1.4$ and $C_p = 1.005\text{kJ/kg-K}$. [10]
- (b) The higher we go, the cooler we find, then why aircrafts are air conditioned when they cruise at an altitude of 8000m? [6]

UNIT- III

- Q.3 (a) Explain the construction and working of thermostatic expansion valve. [8]
- (b) Draw a neat diagram of Electrolux refrigeration and explain its working principle. What is the important role of hydrogen in refrigeration systems? [8]

OR

- Q.3 (a) Describe the working of practical Aqua- Ammonia vapour absorption refrigeration system with neat sketch. [8]
- (b) Write the factors considered for the selection of Refrigerant for a system. Give the chemical formula and names of the refrigerants R-22 and R-114. [8]

UNIT- IV

- Q.4 (a) What is thermal comfort? Explain the typical condition of thermal comfort with the help of bioclimatic chart. [8]
- (b) Moist air at 1.013 bar and 30°C contains 10 gm. of water vapour per kg dry air. Assuming that air and water vapour mixture behaves as an ideal gas and the saturation pressure of vapour at 30°C is 3.167 kpcal. Find the relative humidity of air. [8]

OR

- Q.4 (a) The humidity ratio of atmospheric air at 28°C DBT and 760mm of 1Hg is 0.016 kJ/kg of dry air. Determine- [8]
- (i) Partial pressure of water vapour
 - (ii) Relative humidity
 - (iii) Dew point temperature
 - (iv) Specific enthalpy
- (b) Define the term "Effective Temperature" and explain its importance in the design of air conditioning system. [8]

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UNIT- V

Q.5 (a) What is heat load? Show the various steps of heat load calculation by taking a suitable example. [8]

(b) Write short notes on following- [8]

(i) Effect of bypass factor

(ii) Occupancy and Appliances load

OR

Q.5 (a) Explain the working of year round air conditioning system. [8]

(b) Explain the term cooling load. Explain the method of estimating heat gain due to Infiltration of air. [8]

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7E4060

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Total No of Pages: 3

7E4060**B. Tech. VII Sem. (Back) Exam., Nov. – Dec. - 2018****Mechanical Engineering****7ME1 (O)/7PI6.3 (O) Computer Aided Design****Common with ME, PI****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 (a) Write Bresenham's algorithm for generation of line also indicate which location would be chosen by Bresenham's algorithm when scan converting a line from screen co-ordinate (1, 0) to (10, 3). [12]

(b) What is Output Primitive? What is point and lines in the computer graphics system? [4]

OR

Q.1 (a) Explain the process of displaying objects in vector display and raster display. Draw a block diagrams of the architectures of both the display systems. [10]

(b) Explain color CRT monitor with the help of diagram. [6]

UNIT- II

- Q.2 (a) Explain Hermite cubic spline curve with neat sketch also write its characteristics and obtain the parametric equation for the same. [12]
- (b) Differentiate between Interpolation splines and Approximation spline. [4]

OR

- Q.2 (a) What are Beizer cubic curves? Derive their properties. [8]
- (b) What do you mean by geometric continuity and parametric continuity of curves? [8]

UNIT- III

- Q.3 (a) Write a short note on CSG and B – Rep techniques of solid modelling. [10]
- (b) What do you mean by blending function? Explain rep of a surface. [6]

OR

- Q.3 What is color Models? Explain RGB and CMY color model. [16]

UNIT- IV

- Q.4 (a) Differentiate parallel and perspective projections and derive their projection matrices. [8]
- (b) What is homogenous coordinate system? What are the uses of it? Convert translation, rotation and scaling in homogenous coordinates. [8]

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OR

- Q.4 (a) Reflect the diamond shape Polygon whose vertices are A(-2, 0), B(0, -1), C(2, 0), D(0, 1) about an arbitrary line L which is represented by equation $y = 0.5x + 1$. [8]
- (b) What is composite transformation? Explain Rotation and Scaling about an arbitrary point. [8]

UNIT- V

- Q.5 (a) Explain Cohen- Sutherland line clipping with the help of example. [10]
- (b) With the help of block diagram example the concept of two dimensional viewing transformation from world coordinate. [6]

OR

- Q.5 (a) Explain the following visible surface detection method: [6×2=12]
- (i) Depth buffer
- (ii) Back face detection
- (b) Differentiate between object space and image space method. [4]
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7E7013

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Total No of Pages: 4

7E7013

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Mechanical Engineering
7ME3A Operations Research

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL

2. NIL

UNIT- I

Q.1 (a) Solve the following linear programming by Simplex method [8]

$$\text{Maximize } z = 2x_1 + 7x_2 + 2x_3$$

$$\text{Subject to } 2x_1 + x_2 + 4x_3 \leq 7$$

$$2x_1 + 3x_2 + 3x_3 \leq 12$$

(b) Solve the following transportation problem by Vogel's method: [8]

		Destinations				
Sources		A ₁	A ₂	A ₃	A ₄	Supply
	I	3	1	7	4	300
	II	2	6	5	9	400
	III	8	3	3	2	500
	Demand	250	350	400	200	

OR

1. A 'XYZ' Company have two bottling plants, one located at P_1 and the other at P_2 . Each plant produces three drinks 'A', 'B' and 'C'. The number of bottles produced per day are as follows - [16]

Drink	Plant P_1	Plant P_2
Drink A	1500	1500
Drink B	3000	1000
Drink C	2000	5000

The market survey indicated that during the month of April there will be a demand of 20,000 bottles of drink 'A', 40,000 bottles of drink 'B' and 44,000 bottles of drink 'C'. The operating costs per day of plants at P_1 and P_2 are 600 and 400 monetary units. For how many days should each plant be running in April so as to minimize the production cost, while still meeting the market demand? Solve by two – phase Simplex method.

UNIT- II

2. A manufacturer is offered two machines A and B, A is priced at ₹ 500 and running costs are estimated at ₹ 800 for each of the first five years, increasing by ₹ 200 per year in the sixth and subsequent years. Machine B is having cost of ₹ 1200 per year for sixth year increasing by ₹ 200 per year thereafter. If the time value of money is 10% per year, which machine should be purchased? [16]

OR

2. Solve the following Integer Linear programming using Gomory's Cutting plane method: [16]

$$\text{Max } z = 2x_1 + 3x_2$$

$$\text{Subject to } 2x_1 + 2x_2 \leq 7,$$

$$x_1 \leq 2,$$

$$x_2 \leq 2,$$

$$x_1, x_2 \geq 0 \text{ and are integers}$$

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UNIT- III

Q.3 On an average 96 patients per (24 hours) day require the service of an emergency clinic also, on an average, a patient requires 10 minutes of active attention. Assume that the facilities can handle only one emergency at a time. Suppose that it costs the clinic ₹ 100 per patient treated to obtain an average servicing time of 10 minutes and that each minute of decrease in this average time would cost ₹ 10 per patient treated. How much would have to be budgeted by the clinic to decrease the average size of the queue from $1\frac{1}{3}$ patient to $\frac{1}{2}$ patient? [16]

OR

Q.3 (a) Determine optimum strategy and value of the game for the following pay – off matrix [8]

		Y		
		R	S	T
X	P	200	-10	-100
	Q	100	-110	130

(b) Use the relation of dominance to solve the rectangular game whose pay-off matrix is given below: [8]

	I	II	III	IV	V	VI
I	0	0	0	0	0	0
II	4	2	0	2	1	1
III	4	3	1	3	2	2
IV	4	3	7	-5	1	2
V	4	3	4	-1	2	2
VI	4	3	3	-2	2	2

UNIT- IV

- Q.4 (a) Explain deterministic and stochastic inventory models. [8]
- (b) A manufacturing company purchases 8,000 parts of a machine for its annual requirements, ordering one month use at a time. Each part costs ₹15. The ordering cost per order is ₹10 and the carrying charges are 15% of the average inventory per year. Suggest a more economical purchasing policy for the company. How much would it be possible for the company to save per year? [8]

OR

- Q.4 (a) Write short notes on Decision Trees. [8]
- (b) A particular item has a demand of 9,000 units/year. The cost of one procurement is ₹100 and the holding cost per unit is ₹2.20/year. The replacement is instantaneous and the cost of shortage is ₹5 per unit per year. [8]
- Determine –
- (a) The economic lot size.
- (b) The number of orders per year.
- (c) The time b/w orders.
- (d) The total costs per year if the cost of one unit is ₹50.

UNIT- V

- Q.5 (a) Write short note on Monte-Carlo method of simulation. [8]
- (b) Explain the application of simulation technique to the inventory problems. [8]

OR

- Q.5 (a) A bakery keeps stock of a popular brand of cake. As per previous experience shows that the daily demand pattern for the item associated with probability is given below- [8]

Daily Demand	:	-	0	10	20	30	40	50
Probability	:	-	0.10	0.20	0.15	0.50	0.12	0.02

Use the following sequence of random nos. to simulate the demand for the next 10 days, also find out the average demand per day.

Random Nos. 25, 39, 65, 12, 73, 05, 49, 19, 89, 76

- (b) Find the value of p experimentally by simulation? [8]
-

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7E4063

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7E4063

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Mechanical Engineering

7ME4 (O) / 7MH6.1 Steam Turbines & Steam Power Plant

Common with ME, MH

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. Steam Table

2. Mollier Chart

UNIT- I

Q.1 (a) What is the principle of operations of Steam Turbine? Give classification of Steam Turbine. [8]

(b) What is the difference between Impulse & Reaction Turbine? Show pressure & velocity distribution diagram. [8]

OR

Q.1 (a) What is the purpose of Compounding of Impulse Turbine? Mention types of compounding. Explain simple velocity compounded Impulse Turbine with diagram & its advantage and disadvantages. [10]

(b) Draw & Explain Velocity diagram for Impulse & Reaction Turbine. [6]

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UNIT- II

- Q.2 (a) Find expression for the force, work done, diagram efficiency gross stage efficiency & axial thrust for an Impulse Turbine. [8]
- (b) Deduce general expression for the blade efficiency of a stage of an Impulse Turbine with single row wheel. Find maximum efficiency of turbine. [8]

OR

- Q.2 (a) Explain the various energy losses in Steam Turbines. [8]
- (b) The outlet angle of the blade of Parson's turbine is 20° & axial velocity of flow of steam is 0.5 times the mean blade velocity. Draw velocity diagram for stage consisting one fixed & one moving row of blades. Given that the mean diameter is 71 cm & speed of rotation is 3000 rpm. Calculate Inlet angle of blades. If the steam is to enter the blade channel without shock.
- If the blade height is 6.4 cm the mean steam pressure 5.5 bar, the steam dry and saturated ($V_s = 0.3427 \text{ m}^3/\text{kg}$). Find power developed in the stage. [8]

UNIT- III

- Q.3 (a) What is the basic principle of Regenerative Feed Heating? Explain Regenerative Feed Heating Cycles & their representation of Ideal process on F_s & $h-s$ diagram. [8]

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- (b) In a steam turbine plant, a single bleed is taken from between the high pressure & low pressure section of turbine for regenerative feed heating.

The high pressure section is supplied with Steam at 34 bar & 320°C & Exhaust at 1.5 bar direct to the low pressure section which in turn exhaust at 0.1 bar. The efficiency ratio for both section is 80%. There is difference of 10°C between the bleed temperature & that of the outlet feed water. Draw system & show process on T-S diagram & determine: [8]

- (a) Amount of bleed per kg of Main flow through the boiler
- (b) The work output per kg of main flow
- (c) Thermal efficiency

OR

- Q.3 (a) Explain briefly different types of Feed heaters with neat sketches. [8]
- (b) What are the advantage & disadvantage of reheating? Also explain Regenerative Water Extraction Cycles. [8]

UNIT- IV

- Q.4 (a) What do you mean by governing of steam turbine. What are the chief methods of governing? Explain Nozzle Control & by pass governing with neat sketch. [10]
- (b) What are the factors that influence the selection of blade materials? Mention suitable blade materials & mention methods of attachment of turbine blading to the rotor. [6]

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OR

Q.4 Explain the following briefly –

[16]

- (a) Back pressure turbines
- (b) Pass out turbines
- (c) Mixed pressure turbines

UNIT- V

Q.5 (a) What are the types of fuel for steam generators? Explain briefly fuel handling equipment's. [8]

(b) Explain following Ash handling equipment's – [8]

- (i) Electro Static Precipitator
- (ii) Fabric filters & baghouses

OR

Q.5 (a) Explain Boiler Makeup & Feed Water treatment. [8]

(b) What are the purpose of Cooling Tower? Classify Cooling Tower. Explain Natural Draft Cooling Tower. [8]

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7E7014

Roll No. _____

Total No of Pages: 4**7E7014****B. Tech. VII Sem. (Main / Bank) Exam., Nov. – Dec. - 2018****Mechanical Engineering****7ME4A Turbomachines****Time: 3 Hours****Maximum Marks: 80**
Min. Passing Marks: 26*Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

- Q.1 (a) What do you mean by specific speed of turbo machine? Also explain the significance of specific speed? [8]
- (b) A turbine working under a head of 6m at a speed of 200 r.p.m. develops 80 kW power, when the rate of flow of water is $108\text{m}^3/\text{minute}$. The runner diameter is 1 meter. If the head on this turbine is increased to 16m, determine its new speed, discharge and power. [8]

OR

- Q.1 (a) What is a turbo machine? Also Derive the Euler's expressions for a turbo machine. [8]
- (b) A hydraulic turbine has an output of 6000 kW under a head of 30 m and runs at 85 r.p.m. What is the type of turbine? What would be its speed and power developed when working under a head of 18m? [8]

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UNIT- II

- Q.2 (a) Briefly explain the phenomenon of surge and choking in centrifugal compressor. [6]
- (b) Air at 1.0132 bar and 288 K enters an axial flow compressor stage with an axial velocity of 150 m/s. There are no inlet guide vanes. The rotor stages has a tip diameter of 60 cm and a hub diameter of 50 cm and rotates at 100 r.p.s. The air enters the rotor and leaves the stator in the axial direction with no change in velocity or radius. The air is turned through 30.2° as it passes through rotor. Assume a stage pressure ratio of 1.2. Assuming the constant specific heats and that the air enters and leaves the blade at the blade angles: [10]
- (i) Construct the velocity diagram at mean dia. for this stage
 - (ii) Mass flow rate
 - (iii) Power required
 - (iv) Degree of reaction

OR

- Q.2 (a) Illustrate basic constructional features and working principle of single acting reciprocating compressor. [8]
- (b) Draw a velocity diagram of centrifugal compressor? Also explain the working of centrifugal compressor? [8]

UNIT- III

- Q.3 (a) Explain slip and slip factor for a centrifugal pump. [6]
- (b) Derive an expression for the work done by impeller of a centrifugal pump. [10]

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OR

Q.3 (a) The impeller of a centrifugal pump having an external and internal diameter 400 mm and 200 mm, width of outlet 40 mm and running at 1000 r.p.m. work against a head of 45mm. The velocity of flow through the impeller is constant and equal to 3.0m/s. The vanes are set back at an angle of 40° at outlet.

Determine: [10]

(i) Inlet vane angle

(ii) Work done by the impeller on water per second

(iii) Manometric efficiency

(b) Briefly explain about indicator diagram of a reciprocating pump. [6]

UNIT- IV

Q.4 (a) Explain working of turbojet engine with the help of neat sketch and T-S diagram. [8]

(b) Derive the expression for specific work output and the efficiency of a simple gas turbine cycle with heat exchanger. [8]

OR

Q.4 (a) What are the advantages and disadvantages of a ramjet engine and what are its applications? [6]

(b) A gas turbine operates on a pressure ratio of 6. The Inlet air temperature to the compressor is 300 K and the air entering the turbine is at temperature of 577°C . If the volume rate of air entering the compressor is $240\text{m}^3/\text{s}$. Calculate the net power output of the cycle in MW. Also compute its efficiency. Assume that the cycle operates under ideal conditions. [10]

UNIT- V

Q.5 (a) Explain the following: [8]

(i) Zero percent reaction turbine

(ii) Hundred percent reaction turbine

(b) Explain with a sketch and h-s diagram, the working of a reaction turbine. [8]

OR

Q.5 (a) What do you understand by blade and stage efficiency? Derive an expression for blade efficiency. [8]

(b) Explain what is meant by velocity compounding of a multistage impulse turbine. [8]

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7E4064

Roll No. _____

Total No of Pages: 2

7E4064

B. Tech. VII Sem. (Back) Exam., Nov. – Dec. - 2018
Mechanical Engineering
7ME5 (O) Product Development and Launching

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

UNIT- I

Q.1 What do you understand by Product Life Cycle (PLC)? Explain its various phases by relating a suitable example. [16]

OR

Q.1 Using suitable example explain importance of new product development for the growth of an enterprise. Explain generic product development process for market full product using suitable example. [16]

UNIT- II

Q.2 'Customer needs are generally expressed in terms of customer language'. Clarify statement by considering concept development process. [16]

OR

Q.2 Using a suitable example explain the importance of need identification and its analysis in the product development process. [16]

UNIT- III

Q.3 Explain the concept generation process and its dependence on creativity. How the feasibility of a design concept is tested? [16]

OR

- Q.3 (a) Explain the procedure to carry out concept selection. [8]
(b) What do you mean by 'Fear of Criticism'? [8]

UNIT- IV

Q.4 Define the terms 'Conceptual Design' and 'Embodiment Design'. [16]

OR

Q.4 Explain the various process to detailed design of subsystem. Also show the process involve in component design. [16]

UNIT- V

Q.5 Explain the followings: [16]

- (a) Project Execution process
- (b) Type of evaluation
- (c) Project planning process

OR

Q.5 Discuss the challenges faced by Management for a new product launching. [16]

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7E7015

Roll No. _____

Total No of Pages: 4**7E7015****B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018****Mechanical Engineering****7ME5A Operations Management****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 Explain applications of Operations management. Discuss techniques of demand forecasting. [8+8=16]

OR

Q.1 Differentiate between:

- (a) Time series methods Vs Regression methods [4]
- (b) Accuracy Vs Control of forecasts. [4]
- (c) Qualitative method of demand Vs Quantitative method. [4]
- (d) Statistical technique Vs Operations research techniques. [4]

UNIT- II

- Q.2 Explain capacity planning. Write about determinants of effective capacity. [16]

OR

- Q.2 Describe evaluation of alternatives. Explain Cost – Volume analysis. [8+8=16]

UNIT- III

- Q.3 Write short notes on:

- (a) Cellular layouts [4]
- (b) Combination layout [4]
- (c) Bill of Material [4]
- (b) Line balancing [4]

OR

- Q.3 Write in brief about qualitative and quantitative techniques of location. [16]

UNIT- IV

- Q.4 Describe production control function and also explain lean operation system. [16]

OR

- Q.4 A machine operator has to perform three operations – turning, threading & knurling on a number of different jobs. The time required to perform these operations (in minutes) for each job is known. Determine the order in which the jobs are to be processed so as to minimize the total time required to turn out all the jobs. [16]

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Time (minutes)			
Jobs	Turning	Threading	Knurling
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

Also find:

- (a) Total elapsed time
- (b) Idle time for each machine/operations

UNIT- V

Q.5 Describe project management and write in detail about project life cycle. Discuss in brief about work break down structure. [4+4+8+16]

OR

Q.5 (a) Write about supply chain management. Discuss the need of supply chain management. [4+8=12]

\$72

(b) Draw the network diagram from the following activities & number the events: [4]

(i)	Activity	A	B	C	D	E	F	G	H
	Immediate								
	Predecessors	-	-	A	A	B	B	D,E	F,G

(ii)	Activity	A	B	C	D	E	F	G	H
	Immediate								
	Predecessors	-	-	-	A,B	B,C	C	D	G,E,F

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7E4066	Roll No. _____	Total No of Pages: 2
<p style="font-weight: bold; font-size: 1.2em;">7E4066</p> <p style="font-weight: bold;">B. Tech. VII Sem. (Back) Exam., Nov. – Dec. - 2018</p> <p style="font-weight: bold;">Production & Industrial Engineering</p> <p style="font-weight: bold;">7PI6.2 (O) Mechatronics</p> <p style="font-weight: bold;">Common with ME, PI</p>		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

UNIT- I

Q.1 (a) Describe mechatronics in detail with the help of block diagram. [8]

(b) Write scope of mechatronics in industry. [8]

OR

Q.1 (a) Explain various needs for mechatronics in industry. [8]

(b) Describe applications of mechatronics in the modern world. [8]

UNIT- II

Q.2 (a) Define the following characteristics: [2×4=8]

(i) Accuracy

(ii) Sensitivity

(iii) Hysteresis

(iv) Resolution

(b) Explain the construction and working of LVDT. [8]

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OR

Q.2 Write short notes on:

- (a) Temperature sensor [4]
- (b) Linear and rotational sensor [4]
- (c) Flow sensor [4]
- (d) Acceleration sensor [4]

UNIT- III

- Q.3 (a) What is actuator? Explain various types of pneumatic actuators in detail. [10]
(b) Briefly describe control valves. [6]

OR

- Q.3 (a) Briefly describe:
(i) Mechanical actuator [5]
(ii) Hydraulic actuator [5]
(b) Write various application areas of Hydraulic actuators. [6]

UNIT- IV

- Q.4 (a) Write short notes on:
(i) Analog to digital conversion [5]
(ii) Digital to Analog conversion [5]
(b) Explain the role of controls in mechatronics. [6]

OR

- Q.4 (a) What do you mean by transfer function? Explain pulse transfer function briefly. [10]
(b) Explain briefly:
(i) Transient response [3]
(ii) Frequency response [3]

UNIT- V

- Q.5 (a) Describe CNC lathe in detail. [8]
(b) What do you mean by elevator system? Explain its types. [8]

OR

- Q.5 (a) How temperature is controlled in heat treatment process? Explain briefly. [8]
(b) What are the technologies used in manipulated arms? [8]

7E7018

Roll No. _____

Total No of Pages: 3

7E7018

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018
Mechanical Engineering
7ME6.3A CNC Machines and Programming
Common with ME, PI

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

UNIT- I

Q.1 (a) With the help of a neat diagram, explain various elements of a NC Machine and also advantages and disadvantages of NC Machine. [8]

(b) Describe the comparison of NC and Conventional Machines. [8]

OR

Q.1 (a) Describe the short notes:-

(i) Automation of NC system. [4]

(ii) Application of NC & CNC Machine. [4]

(b) Define the NC, CNC and DNC system with help of diagrams clearly indicating difference in these system. [8]

UNIT- II

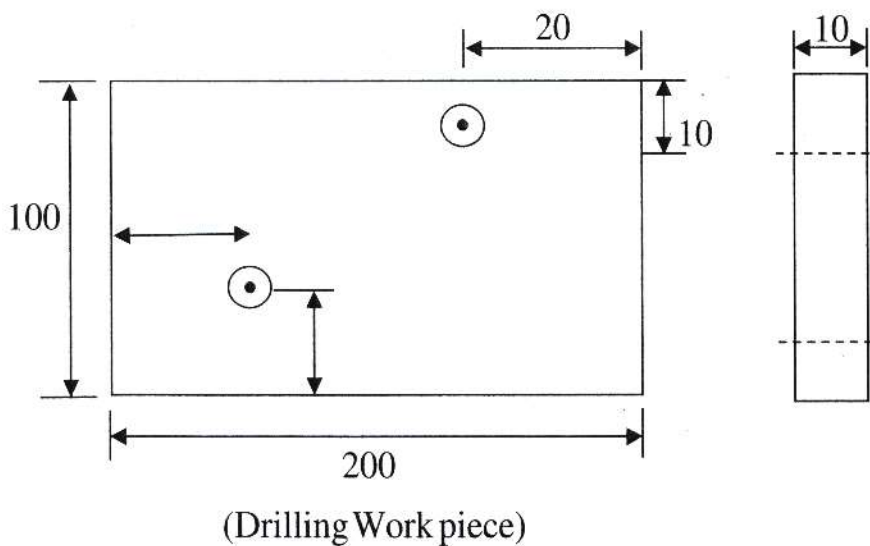
- Q.2 (a) Explain the mechanical element and guide way element of CNC system. [8]
 (b) Describe the coolant system and lubrication system. [8]

OR

- Q.2 (a) Explain the short notes in detail:-
 (i) Control loops. [4]
 (ii) Interpolators [4]
 (iii) Sensors [4]
 (iv) Spindle unit [4]

UNIT- III

- Q.3 (a) What do you mean by APT language, give examples of few commands with program. [8]
 (b) For work piece shown in figure given below write down manual part programming of NC to, Drill two holes using drilling machine. The dimension of work piece are $(200 \times 100 \times 10)$ mm. The hole diameter is 10mm. Assume target point of tool is at $(-20, -20, 10)$ [8]



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OR

- Q.3 (a) What do you mean by computer aided part programming and NC part programming. [8]
- (b) Describe the Automatic part programming generation. [8]

UNIT- IV

- Q.4 (a) Define the CAPP system by the 5 axis programming of machine. [8]
- (b) Define the basic component of a robot system and law of robotics. [8]

OR

- Q.4 (a) Explain the kinematic simulation and volumetric simulation. [8]
- (b) What is a NC simulation and explain the application of volumetric NC simulation. [8]

UNIT- V

- Q.5 (a) What is Adaptive control and off – line adaptive control. [8]
- (b) Define the difference between Hardware Based AC and Software Based AC (Adaptive control). [8]

OR

Q.5 Discuss the following short notes:-

- (a) Die sinking [4]
- (b) CAM (Computer Aided Manufacturing system) [4]
- (c) FMS (Flexible Manufacturing system) [4]
- (d) Rapid product development. [4]
-

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7E7017

Roll No. _____

Total No of Pages: 3

7E7017

B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018

Mechanical Engineering

7ME6.2A Robotics

Common with ME, PI

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL _____

2. NIL _____

UNIT- I

Q.1 (a) What do you mean by robotics. Explain in detail laws of robotics. [8]

(b) What is progressive advancement in robotics? Explain. [8]

OR

Q.1 (a) What do you understand by human arm characteristics of robot. [8]

(b) With the help of neat sketch, explain the manipulation and control of robots. [8]

UNIT- II

Q.2 (a) Describe the robot configuration with neat sketches. [8]

(b) What do you mean by transforms? Explain the inverting homogeneous transform. [8]

OR

- Q.2 (a) Give the description of objects in space. [8]
(b) Explain the transformation of vectors. [8]

UNIT- III

- Q.3 (a) Explain Denavit – Hartenberg convention with neat sketches. [8]
(b) Derive inverse kinematic equations of manipulator for a particular position. [8]

OR

- Q.3 (a) Explain the cooperation and interaction between human and humanoid robots. [8]
(b) What do you mean by manipulator transformation Matrix? [8]

UNIT- IV

- Q.4 (a) Explain the role of sensors in robotics. Give classification of sensors. [8]
(b) Explain application of any one sensor in robot with neat sketch in detail. [8]

OR

- Q.4 (a) Explain the applications of vision – controlled Robotics system. [8]
(b) Explain the principle of the term “Image Processing”. [8]

UNIT- V

- Q.5 (a) Write short notes on:
(i) Robot safety. [5]
(ii) Non – industrial application of robots. [5]
(iii) Inspection application of robots. [6]

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OR

Q.5 (a) Explain material handling applications of robots in industry in detail. [8]

(b) How is programming in robot done? Explain. [8]

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7E4067

Total No. of Questions:

Total No. of Pages: 02

Roll No. _____

B.Tech. VII-Sem (Back) Dec. 2018
Mechanical Engineering
7ME6.3(O) Computer Integrated Manufacturing
7E4067

Time: 3Hours

Maximum Marks: 80
Min Passing Marks: 26

Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

____ **UNIT -I**

- Q. 1 a) What are the advantages of NC Machining and When is economically justified?
 b) Differentiate between types of manufacturing systems. Discuss the functions and organization of MCU in NC system.

[8+8=16]

OR

- Q.1 a) What are the roles of CAM tools in the manufacturing process?
 b) What is Numerical Control? Compare Conventional Manufacturing with CNC Manufacturing . Also discuss about the history, development and current status of CNC technology.

[8+8=16]

UNIT -II

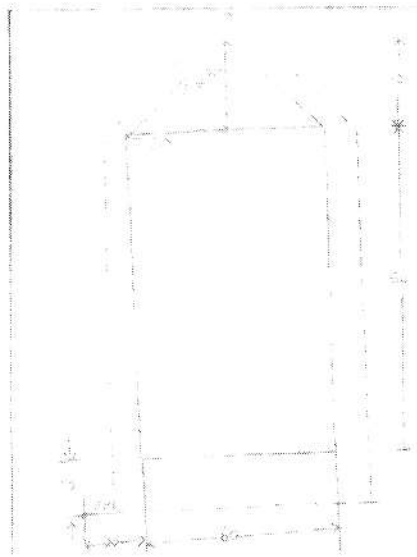
- Q. 2 With the help of block diagram, explain the difference between Manual Part Programming and Computer Aided Part Programming and various stages involved in each.

[16]

OR

P.T.O

Q.2 Write a manual part program using GM codes for given component in Fig.1



----- represent cutter path
 SP: Starting Point
 _____ Part Boundaries
 All Dimensions are in MM

Fig.1

[16]

UNIT -III

Q. 3 Discuss in detail retrieval and generative approaches to Computer Aided Process Planning. Give their relative merits and demerits with suitable examples and flow chart.

[16]

OR

Q.3 Discuss in detail, how Group Technology is used in designed manufacturing Cells. Give an example.

[16]

UNIT -IV

Q. 4 Explain the construction features and working principle of co-ordinate measuring machines.(CMM)

[16]

OR

Q.4 What are the functions of Production Planning and Contract Management System? Also write the problem with traditional Production Planning and Control System.

[16]

UNIT -V

Q. 5 Discuss various elements of CIM System. How it is different form FMS?

[16]

OR

Q.5 Write notes on :
 a) Agile Manufacturing
 b) Lean Manufacturing

[8+8 =16]